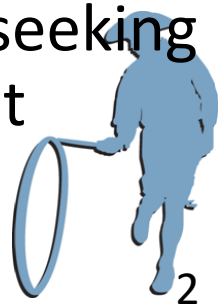
STAFFORD Virginia

Comprehensive Road Evaluation Public Meeting

January 16 & 23, 2019

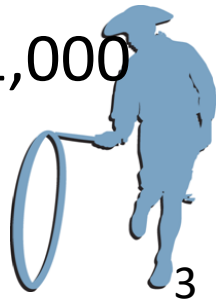
Background

- The Board of Supervisors has selected transportation improvements as a priority, and last March authorized County staff to conduct a comprehensive road evaluation
- This Study was to provide a data driven analysis of the County road system, and serve as the basis for future road improvement decisions
- As this effort proceeded, staff sought guidance from the ad hoc committee assigned by the Board, the Infrastructure Committee, and the full Board
- The analysis is now nearly complete, and the Board is seeking public involvement prior to making any decisions about transportation improvements



Study Scope

- First, those roads which have less impact for Stafford residents, or which could not reasonably be addressed by a local government initiative were eliminated
  - The major primary highways in Stafford, Route 1, 17, and 3 were not included
  - Interstate 95 was not included
  - Eliminated virtually all subdivision streets from the study
- This left over 200 secondary roads, along with two smaller primary highways, Butler Road and White Oak Road, to be analyzed
- To ensure the study effort focused on roads used by the majority of motorists, roads with a traffic count below 1,000 vehicles per day (VPD) were eliminated
- 94 roads remained for detailed analysis

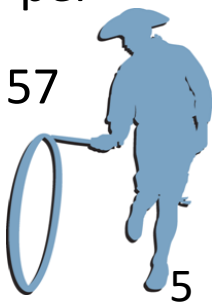


Evaluation Process

- After review of the roads to be studied, staff broke down those roads with diverse road construction and/or traffic use into smaller sections for better analysis
- This resulted in a total of 114 roads/road segments selected for additional study
- VDOT provided the most recent (2016) traffic count data, supplemented with targeted counts using County equipment
- VDOT provided 3 years of accident data (crash, injury, and fatality), and the Sheriff's Office provided additional accident data
- Staff also assembled constituent reports regarding road concerns, previously completed studies of selected roads, and documented road construction characteristics for each section of road being studied, along with any unusual traffic patterns or use which might affect road safety

Evaluation Process (cont.)

- Selected roads were then evaluated and scored based on the following criteria:
  - traffic count per lane
  - road width and the presence/absence of shoulders
  - crash, injury and fatality rates
  - potential for future traffic growth
- Unscored criteria included:
  - Whether improvements were recently completed, funded, or under design or construction
  - Staff has received motorist complaints
  - The road had special traffic conditions which might warrant additional analysis (higher percentage of truck and trailer traffic, abnormally high peak traffic periods, higher percentage of youth drivers, periodic flooding, etc.)
  - Whether a safety study of the road had been done
- Roads were then further segregated by traffic count per lane to allow a comparison between similar roads, with the threshold set at 1,700 VPD per lane
- This resulted in 57 roads or road segments above 1,700 VPD/Lane, and 57 under



Scoring Methodology

- **Vehicle Use**: Traffic counts were adjusted to vehicles per day per lane to assess the congestion factor of each road, with more congested roads receiving higher scores

VPD/Lane	Score
> 10,000	**500**
> 7,500< 10,000	**400**
> 5,000< 7,500	**300**
>2,000< 5,000	**200**
< 2,000	**100**

- **Road Structural Characteristics**: road construction characteristics were scored, with narrower roads receiving a higher score

Road Character Description	Score
No centerline, edge lines or shoulders	**300**
Centerline with no edge lines or shoulders	**200**
Centerline and edge lines, but no shoulders	**100**
Has centerline, edge lines and shoulders	**0**

Scoring Methodology (cont.)

- **Safety Record**: 3-year crash, injury and fatality rates were entered for each road and road segment, where listed separately. These rates were compared against statewide averages and scores assigned as noted below

Crash Rates Relative to State Average (Primary=126; Secondary=203)	Score
≥ State Average	**300**
≥ .6X < 1X State Average	**200**
≥ .4X < .6X State Average	**100**
< .4X State Average	**0**

Injury Rates Relative to State Average (Primary=67; Secondary=101)	Score
≥ 3X State Average	**500**
≥ 1X <3X State Average	**300**
≥ .5X <1X State Average	**100**
< .5X State Average	**0**

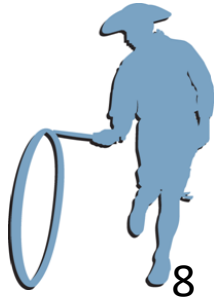
Fatality Rates Relative to State Average (Primary=1.11; Secondary=1.5)	Score
≥ State Average	**300**
≥ .5X < State Average	**100**
< .5X State Average	**0**

- Reportable accidents are defined as those causing injury, fatality, or property damage over $1,500
- This system weighs injury statistics more heavily as a means of identifying roads subject to more serious accidents, while providing a larger data sample

Scoring Methodology (cont.)

- **Potential for Growth**: categorizes roads on the basis of their use for accessing the major transportation corridors (Route 1 & I-95), location in areas experiencing greater growth and/or cut through pressures

Characteristics	Score
Major east-west route providing access to Route 1 and I-95 from eastern or western Stafford County, or parallel road to Route 1 and I-95 serving as an alternative for motorists to these roads	**300**
Major secondary route within an area of the County experiencing significant growth pressures; will serve a planned future infrastructure improvement (e.g. park, school); or a road with a demonstrated use for cut through traffic	**200**
Road with expected increase in traffic typical of a developing locality	**100**



Study Scope Refinements

- Staff presented an update on the Study to the Infrastructure Committee at their October meeting, and to the Board on November 27th
- The Board directed additional analysis on 63 roads/road segments
- The list included those roads/road segments with the highest total score, along with certain identified as problem roads from public input, experienced unique crash patterns warranting further study, and those identified by the Youth Driver Task Force but not addressed by earlier road improvements
- This resulted in 38 roads/road segments $\geq$ 1,700 VPD/Lane, and 25 < 1,700 VPD/Lane

RECOMMENDED ROAD LIST FOR FURTHER ANALYSIS

Roads ≥ 1,700 VPD/Lane

BUTLER ROAD - Falmouth Intersection to Castle Rock Drive
BUTLER ROAD/WHITE OAK ROAD - Castle Rock Drive to Baron Park Road
RAMOTH CHURCH ROAD
ONVILLE ROAD
MORTON ROAD
LAYHILL ROAD
GARRISONVILLE ROAD - Joshua Road to Arrowhead Drive
GARRISONVILLE ROAD - I-95 to Onville Road
GARRISONVILLE ROAD – Arrowhead Drive to Fauquier County Line
GARRISONVILLE ROAD - Eustace Road to Shelton Shop Road
GARRISONVILLE ROAD - Onville Road to Eustace Road
GARRISONVILLE ROAD - Shelton Shop Road to Joshua Road
SHELTON SHOP ROAD
HARTWOOD CHURCH ROAD
COURTHOUSE ROAD - (West) Winding Creek Road to Shelton Shop Road
POPLAR ROAD – Kellogg Mill Road to Hartwood Road
PLANTATION DRIVE
MOUNTAIN VIEW ROAD – Centreport Parkway to Kellogg Mill Road
BARRETT HEIGHTS ROAD
JOSHUA ROAD
ANDREW CHAPEL ROAD
DOC STONE ROAD
POPLAR ROAD - Route 17 to Stefaniga Road
PRIMMER HOUSE ROAD
MINE ROAD
WHITE OAK ROAD - Baron Park Road to Ferry Road
ENON ROAD - Rt.1 to Stafford Indians Lane
FERRY ROAD
TELEGRAPH ROAD
WHITE OAK ROAD - Ferry Road to King George County Line
BEREA CHURCH ROAD
EUSTACE ROAD
HOPE ROAD
LEELAND ROAD - Deacon Road to Morton Road
ENON ROAD – Stafford Indians Lane to Truslow Road
WINDING CREEK ROAD - Embrey Mill Road to Shelton Shop Road
WINDING CREEK ROAD - Courthouse Rd to Embrey Mill Road
MOUNTAIN VIEW ROAD - Kellogg Mill Road to Choptank Road

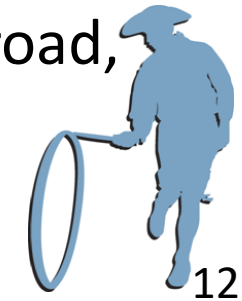
RECOMMENDED ROAD LIST FOR FURTHER ANALYSIS

Roads < 1,700 VPD/Lane

BRENT POINT ROAD - Quarry Road to Arkendale Road
WOODSTOCK LANE (S.R. 646)
TACKETTS MILL ROAD
HEFLIN ROAD
TACKETTS MILL ROAD (S.R. 612)
FALLS RUN DRIVE
LEELAND ROAD - Morton Road to End of State Maintenance
SPOTTED TAVERN ROAD
BRENT POINT ROAD - Arkendale Road to End
BROOKE ROAD - New Hope Church Road to Eskimo Hill Road
LICHFIELD BOULEVARD
MCWHIRT LOOP
STEFANIGA ROAD
TRUSLOW ROAD – Cambridge Street to Plantation Drive
LITTLE WHIM ROAD
HOLLY CORNER ROAD
POTOMAC RUN ROAD
ROCK HILL CHURCH ROAD
WEST CAMBRIDGE STREET
CROPP ROAD
KELLOGG MILL ROAD
BROOKE ROAD - Eskimo Hill to End
DECATUR ROAD
RICHARDS FERRY ROAD
HARTWOOD ROAD

Phase 2 Evaluation Process

- The threshold to receive 500 points for injury rate statistics was reduced from 3 times state average to 2 times state average
- Evaluation criteria was added to account for variations in the density of accidents, instead of only the accident rate
  - Use of the accident rate alone resulted in high scores for roads which were more lightly traveled, with a low number of accidents
- Also added a scoring category for operational performance
- The new scores were added to previous the previous scoring subtotal
- Reviewed accident descriptions and mapping for every road, allowing identification by the nature of the accidents (congestion, intersection & road geometry)



Phase 2 Scoring Methodology

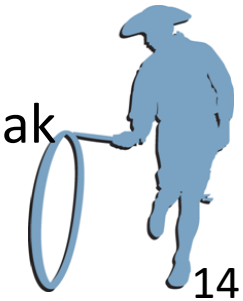
- **Accident Density (accidents/mile)**: Divided the total number of reported accidents over the 3-year study period by the length of the road segment to generate the number of accidents per mile

Accidents/Mile	Score
≥ 20	**300**
> 10.1; <20	**200**
>5.1; ≤ 10	**100**
<5	**0**

- Reportable accidents are defined as those causing injury, fatality, or property damage over $1,500

Scoring Methodology (cont.)

- **Operational Rating**: categorizes roads based on a ratio of road capacity in vehicles/hour versus road use in vehicles per hour
- Used methodology and road capacity assessment from our County-wide Road Impact Fee Analysis
- The Impact Fee Analysis reviewed the primary and secondary roads in the County, divided them into multiple segments, and assigned a capacity for each segment, based on multiple factors
  - Number of lanes
  - Lane width
  - Shoulders (presence/absence)
  - Horizontal and vertical curvature
  - Density of driveway entrances
  - Intersections
  - Commercial entrances
- This generated a capacity per hour, which was divided by the peak hourly road use to provide a volume to capacity ratio



Scoring Methodology (cont.)

Peak Hourly Volume/Road Capacity	Operational Rating
0.01 - 0.04	A
0.05 - 0.17	B
0.18 - 0.31	C
0.32 - 0.49	D
0.49 - 0.96	E
≥ 0.97	F

Operational Rating	Score
A,B	**0**
C,D	**200**
E,F	**400**

Accident Review

- VDOT provided detailed information related to the nature of the accidents on a road segment including description, location, and diagrams
- These were reviewed for each segment
- Accidents were segregated into two general categories

Accident Category	Accident Description
Congestion & Intersection	Rear end, side swipe (same direction) & angle
Road Geometry (width, curvature)	Run-off road, side swipe (opp. dir.) & head-on

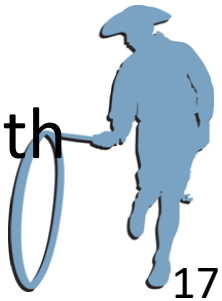
- This information was summarized and used to identify a recommended road improvement

Cost Estimate

- Used recent County and VDOT Experience
- Applied to five different improvement alternatives for higher traffic roads

4 to 6 lane widening urban area (e.g. Garrisonville Road)	$25,000,000	per mile
2 to 4 lane widening suburban/rural area (e.g. Courthouse Road)	$21,000,000	per mile
2 to 3 lane widening (continuous 2-way left turn lane like Plantation Dr.)	$17,000,000	per mile
2 lane reconstruction (e.g. Mountain View, Truslow & Poplar Rds)	$11,000,000	per mile
2 lane improvement to 3R standard (e.g. Brooke Road)	$6,500,000	per mile

- For lesser traveled roads, VDOT provided a cost per mile of $110,000 for a 2’ shoulder wedge improvement
- This improvement would need to be coordinated with VDOT’s repaving schedule



Road Reconstruction

Truslow Road Before

Road Reconstruction

Truslow Road After

Shoulder Wedge Process

Bells Hill Road Before

Shoulder Wedge Process

Bells Hill Road After

Roads Over 1,700 VPD/Lane (Page 1)

	No#	Road Segment	Route Number	Number of Lanes	Facility Type	Safety						Operational Considerations					Implementation				
						Subtotal Score	Total # of Crashes	Length (Miles)	Initial Review Comments	Crashes per Mile	Score	Cap/hr	veh/hr	vol/cap ratio	Rating	Score	Recommended Improvement	Total Cost	Total Score	Running Total	COMMENTS
1	3a	BUTLER RD Falmouth Int to Castle Rock	218	2	Minor Collector	1800	45	0.9	Congested 2-lane rural section sandwiched between improved 4-lane sections. 37 intersection caused crashes and 7 road width; 3 fatalities.	50.0	300	2100	2174	1.04	F	400	2 to 4-lane widening (urban)	$ 18,900,000	2500	$ 18,900,000	
2	1a	GARRISONVILLE RD I-95 to Onville Road	610	6	Minor Arterial	1700	269	1.36	269 crashes on this 1.36 mi section, overwhelmingly congestion related	197.8	300	7800	6480	0.83	E	400	STARS Study	TBD	2400		
3	11	SHELTON SHOP RD	648	2	Minor collector	1400	83	1.9	This is a heavily traveled, rural style road in a developing area with high schools on either end. 48 of the 80 crashes are intersection related, with most of the rest road width caused.	43.7	300	2100	1380	0.66	E	400	2 to 3 lane widening	$ 32,300,000	2100	$ 51,200,000	
4	9a	BUTLER/WHITE OAK RD Castle Rock to Baron Pk Rd	218	4	Major Collector	1600	46	0.86	36 crashes intersection related with 4 others sideswipe-same direction (4-lane road). 1 fatality,20 injuries	53.5	300	5000	1438	0.29	C	200	STARS Study	TBD	2100		
5	15	MORTON RD	624	2	Minor collector, major local	1500	11	0.38	8 crashes appear intersection related and 3 road width related (run off & head on)	28.9	300	2100	864	0.41	D	200	2 to 3 lane widening	$ 6,460,000	2000	$ 57,660,000	
6	1c	GARRISONVILLE RD Eustace Road to Shelton Shop	610	4	Major Collector	1300	82	1.38	Vast majority of crashes were congestion/intersection related.	59.4	300	4800	2970	0.62	E	400	4 to 6-lane widening (urban)	$ 34,500,000	2000	$ 92,160,000	
7	38	RAMOTH CHURCH RD	628	2	Major local	1600	38	4.45	36 crashes including 17 run off road spread along entire 4.5 mile segment. High number (24) with injuries.	8.5	100	1400	378	0.27	C	200	2 lane reconstruction	$ 8,800,000	1900	$ 100,960,000	Encourage use of Woodcutters Road by improving Kellogg Mill/Ramoth Church Rds (0.8 mi.) to
8	18	ONVILLE RD	641	2	Minor collector	1300	36	1.2	36 crashes distributed along road with increase at intersections. Multiple run off road accidents.	30.0	300	2000	846	0.42	D	200	2 to 3 lane widening/2 lane reconstruction	$ 15,700,000	1800	$ 116,660,000	
9		WHITE OAK RD Baron Park to Ferry Rd	218	2	Major Collector	1200	31	1.82	31 crashes, 19 injuries with most intersection related	17.0	200	2500	1412	0.56	E	400	2 to 4 lane widening (rural)	$ 38,220,000	1800	$ 154,880,000	
10	1b	GARRISONVILLE RD Onville Rd to Eustace Rd	610	6	Major Collector	1300	97	0.64	Very high number of congestion and intersection related crashes. Project recently completely that should improve situation.	151.6	300	7000	3420	0.49	D	200	COMPLETED		1800		
11	14	LAYHILL RD	624	2	Major local	1200	17	0.5	9 crashes appear intersection related with 7 width related (run-off and sideswipe)	34.0	300	2100	873	0.42	D	200	2 to 3 lane widening	$ 8,500,000	1700	$ 163,380,000	
12		MOUNTAIN VIEW RD Kellogg Mill to Choptank Road	627	2	Major local	1100	33	3.13	Numerous accidents, combination of intersection and road geometry	10.5	200	1400	996	0.71	E	400	2 lane reconstruction	$ 34,430,000	1700	$ 197,810,000	
13	46	BEREA CHURCH RD	654	2	Major local	1400	10	1.33	Combination of intersection and road geometry related crashes. A project to resolve problems with Berea Church Road is funded and under design.	7.5	100	1200	306	0.26	C	200	UNDERWAY		1700		
14	35	ANDREW CHAPEL RD	629	2	Major local	1200	11	0.9	11 accidents including 5 off road spread along .9 mile section	12.2	200	1400	405	0.29	C	200	2 lane reconstruction	$ 9,900,000	1600	$ 207,710,000	
15	31a	POPLAR RD Rt 17 to Stefaniga	616	2	Major local	1200	47	3.6	While 9 crashes occurred in the recently imroved section, there were many more crashes north of the improved area with intersection and run off road prevalent.	13.1	200	1400	450	0.32	D	200	2 lane reconstruction/ 2 lane improvement	$ 19,800,000	1600	$ 227,510,000	0.5 miles 2-lane reconstruction to Kellogg Mill road; then 2.2 miles 2-lane improvement (3R) to Stephaniga Rd
16	39c	WINDING CREEK RD Embrey Mill to Shelton Shop	628	2	Major local	1200	15	1.3	Mix of intersection crashes and road geometry related	11.5	200	1200	399	0.33	D	200	2 lane reconstruction	$ 14,300,000	1600	$ 241,810,000	
17	24a	ENON RD Rt.1 to Stafford Indians Ln	753	2	Major Local	1000	24	0.68	Preponderance of intersection related crashes. Calculation at right adds crashes on Enon to those counted on rt 1 at intersection with Enon	35.3	300	2200	969	0.44	D	200	2 to 3 lane widening	$ 8,000,000	1500	$ 249,810,000	In case Smart Scale application is unsuccessful.
18	13a	LEELAND Jilian Dr to Portland Dr	626		Major Local	900	5	0.4	Intersection type crashes. HSIP project funded and under design.	12.5	200	1300	900	0.69	E	400	2 to 3 lane widening	$5,270,000	1500	$ 255,080,000	VDOT recently raised the estimated cost of this project to $9 million, requiring $5.3 million in supplemental County funding.

Roads Over 1,700 VPD/Lane (Page 2)

	No#	Road Segment	Route Number	Number of Lanes	Facility Type	Safety						Operational Considerations					Implementation				
						Subtotal Score	Total # of Crashes	Length (Miles)	Initial Review Comments	Crashes per Mile	Score	Cap/hr	veh/hr	vol/cap ratio	Rating	Score	Recommended Improvement	Total Cost	Total Score	Running Total	COMMENTS
19	29	DOC STONE RD	659	2	Major local	1200	9	1.44	Of the 9 crashes reported, all but 1 occurred between Rt. 610 and roundabout. These appear congestion related in the commercial sector of road.	6.3	100	1200	459	0.38	D	200			1500		Not recommended-most accidents in the congested commercial area near Doc Stone Commons
20	9b	WHITE OAK RD Ferry Rd to K.G County	218	2	Minor Collector	1100	46	4.14	46 crashes, 21 injuries with about half intersection related and the others road width/lack of shoulders	11.1	200	2200	917	0.42	D	200			1500		A 2-lane reconstruction along this road would cost approximately $46 million
21	42	HARTWOOD CHURCH RD	705	2	N/A	1300	2	0.4	2 accidents; 1 rear end (at Rt. 17 intersection and 1 run off road at Rt. 17	5.0	0	1400	342	0.24	C	200			1500		intersection with Route 17. No reconstruction efforts are
22	6	MINE RD	684	4	Major and minor collector	1100	43	2.46	Of the 43 crashes, 27 were intersection related and 6 were sideswioe same direction. Many in congested area near Rt 610.	17.5	200	4000	1440	0.36	D	200			1500		A 4 to 6 lane widening would cost approximately $60 million
23	36	TELEGRAPH RD	637	2	Minor collector, major local	1100	35	3.55	Mix of intersection and road geometry crashes including 2 involving pedestrians	9.9	100	2100	396	0.19	C	200			1400		
24	10	PLANTATION DR	1706	2	Major and minor collector	1000	25	1.6	Primarily intersection related crashes. The two way left turn lane extends the entire distance.	15.6	200	4000	1080	0.27	C	200			1400		
25	32	JOSHUA RD	643	2	Major local	1000	23	2.3	23 crashes & 7 injuries; 6 are intersection and 12 road geometry related.	10.0	100	1400	441	0.32	D	200			1300		
26	24b	ENON RD Staff Ind Ln to Truslow Rd	753	2	Major local	1000	11	1.31	Preponderance of crashes near water tank. May be opportunity for localized safety improvement.	8.4	100	2200	773	0.35	D	200			1300		
27	2b	COURTHOUSE RD (West) Winding Cr to Shelton Shop	630	2	Minor Collector	900	22	1.57	5 injuries in 22 crashes; most are intersection related with a few road geometry related	14.0	200	2100	766	0.36	D	200			1300		
28	12	FERRY RD	606	2	Minor collector	900	36	2.69	Of the 36 crashes, 16 were at Rt 3 in area of planned improvements. Balance spread out, with more intersection related	13.4	200	2100	900	0.43	D	200			1300		
29	39a	WINDING CREEK RD Courthouse Rd to Embrey Mill	628	2	Major local	1000	9	1.12	Few crashes between Rt 630 & Embrey Mill. Higher rate after Embrey Mill	8.0	100	1200	399	0.33	D	200			1300		
30	40	BARRETT HEIGHTS RD	642	2	Major local	1000	9	1.1	Primarily intersection related crashes.	8.2	100	1100	351	0.32	D	200			1300		
31	31b	POPLAR RD Kellogg Mill to Hartwood Rd	616	2	Major local	1000	41	6.22	41 accidents, with a few intersection, but mostly road geometry related	6.6	100	1400	315	0.23	C	200			1300		
32	25	EUSTACE RD	751	2	Major local	900	16	2.08	All 16 crashes appear intersection related, many clustered near Rt 610.	7.7	100	1200	522	0.44	D	200			1200		
33	1d	GARRISONVILLE RD Shelton Shop to Joshua	610	4	Major Collector	700	51	1.75	Crashes are mainly intersection and congestion related.	29.1	300	5000	1440	0.29	C	200			1200		
34	20a	MOUNTAIN VIEW RD Centreport to Kellogg Mill	627	2	Major local	900	10	3.26	Lower rate and fewer crashes on this section of road.	3.1	0	1400	315	0.23	C	200			1100		
35	16	PRIMMER HOUSE RD	624	2	Minor collector, major local	700	6	0.56	6 crashes, 4 were intersection related and none road geometry related.	10.7	200	2200	864	0.39	D	200			1100		
36	33	HOPE RD	687	2	Minor collector, major local	800	16	3.23	5 intersection, 9 road geometry caused crashes, with only 3 past Walker Way	5.0	0	1200	441	0.37	D	200			1000		
37	1e	GARRISONVILLE RD Joshua to Lk Arrowhead	610	2	Minor Collector	600	42	3.65	Significant number of crashes spread along the entire stretch of road, but closer review indicates a lower priority overall.	11.5	100	2200	900	0.41	D	200			900		
38	1f	GARRISONVILLE RD Lk Arrowhead to Fauquier	610	2	Minor Collector	700	7	1.98	Relatively few crashes past the Lake Arrowhead turn off, but 1 fatality on a low volume road increased overall score.	3.5	0	2200	531	0.24	C	200			900		

Roads Under 1,700 VPD/Lane (Page 1)

	No#	Road Segment	Route Number	Number of Lanes	Facility Type	Safety						Operations					Implementation				
						Score	Total # of Crashes	Length (Miles)	Initial review Comments	Crashes per Mile	Score	Cap/hr	veh/hr	vol/cap ratio	Rating	Score	Recommended Improvement	Total Cost	Total Score	Running Total	Comments
1	70	WOODSTOCK LN	639	2	N/A	1400	5	0.18	Five crashes and one injury resulted in the scoring. These occurred near the intersection with Route 1, which is being improved.	27.8	300	800	162	0.20	C	200	2' Shoulder Wedge w/ Overlay	$ 19,569	1900	$ 19,569	Although the intersection is scheduled for improvement as a Smart Scale project, widening the remaining section would be an improvement.
2	57	FALLS RUN DR	618	2	Minor collector	1300	8	0.45	Both the description and location of these crashes indicate intersection related accidents.	17.8	200	2000	216	0.11	B	0	2' Shoulder Wedge w/ Overlay	$ 48,923	1500	$ 68,492	This is a rural road section in an urbanized area of the County
3	47a	BROOKE RD New Hope to Eskimo Hill	608	2	Major local	1100	37	5.45	Of the 37 crashes, over half were road geometry related	6.8	100	1400	297	0.21	C	200	2' Shoulder Wedge w/ Overlay	$ 592,513	1400	$ 661,005	Minus the portion improved as a safety enhancement
4	45	KELLOGG MILL RD	651	2	Major local	1000	40	4.66	Multiple rear end and run off road	8.6	100	1400	306	0.22	C	200	2' Shoulder Wedge w/ Overlay	$ 506,626	1300	$ 1,167,631	
5	43	LICHFIELD BLVD	700	3	Minor collector	1000	17	0.63	Majority of intersection related crashes, mainly in the commercial area	27.0	300	2000	333	0.17	B	0		$ -	1300	$ 1,167,631	Shoulder wedge would not improve this urban/residential road section
6	95a	BRENT POINT RD Quarry Rd to Arkendale Rd	658	2	Minor Local	1300	1	1.68	While the rate is very high, there was only a single accident, which resulted in an injury, on a road with a very low traffic count. This unpaved road is programmed for hard surfacing under the SSYP.	0.6	0	1400	10	0.01	A	0		$ -	1300	$ 1,167,631	This road section is programmed for funding under the rural paving program
7	85	TACKETTS MILL RD	646	2	Major local	1200	14	1.5	4 angle crashes (intersection related),1 sideswipe and 6 run off road on 1.5 mile section.	9.3	100	1400	126	0.09	B	0	2' Shoulder Wedge w/ Overlay	$ 163,077	1300	$ 1,330,708	
8	60	HEFLIN RD	612	2	Major local	1200	2	1.34	2 run off road with 2 injuries	1.5	0	1200	198	0.17	B	0	2' Shoulder Wedge w/ Overlay	$ 145,682	1200	$ 1,476,390	
9	95b	BRENT POINT RD Arkendale Rd to End	658	2	Minor Local	1200	6	3.2	Six crashes; 3 were road geometry, 2 train related.	1.9	0	1400	48	0.03	A	0	2' Shoulder Wedge w/ Overlay	$ 347,898	1200	$ 1,824,288	Includes only that portion to the state park
10	59	MCWHIRT LOOP	700	2	Major and minor collector	1000	9	0.56	All crashes occurred near intersections	16.1	200	2100	207	0.10	B	0		$ -	1200	$ 1,824,288	Shoulder wedge would not improve this commercial/industrial road section
11	63	STEFANIGA RD	648	2	Major local	1100	18	3.48	Crashes spread out along road	5.2	100	1400	189	0.14	B	0	2' Shoulder Wedge w/ Overlay	$ 378,339	1200	$ 2,202,627	
12	90	WEST CAMBRIDGE ST	607	2	Major local	1000	2	0.1	1 bicyclist & 1 sideswipe	20.0	200	700	99	0.14	B	0		$ -	1200	$ 2,202,627	Shoulder wedge would not improve this urban/residential road section
13	49b	TRUSLOW RD Cambridge to Berea Church	652	2	Minor Collector	1100	25	4.22	Preponderance of road geometry related crasshes	5.9	100	2100	189	0.09	B	0	2' Shoulder Wedge w/ Overlay	$ 458,790	1200	$ 2,661,417	Minus the portion improved as a 2-lane reconstruction

Roads Under 1,700 VPD/Lane (Page 2)

	No#	Road Segment	Route Number	Number of Lanes	Facility Type	Safety					Operations					Implementation				
						Score	Total # of Crashes	Length (Miles)	Initial review Comments	Crashes per Mile	Score	Cap/hr	veh/hr	vol/cap ratio	Rating	Score	Recommended Improvement	Total Cost	Total Score	Running Total	Comments
14	66	TACKETTS MILL RD	612	2	Major local	**1000**	**15**	1.76	**4 angle crashes (intersection related),2 head-on and 7 run off road on 1 3/4 mile section. Clustered near southern end.**	8.5	**100**	1400	180	0.13	B	**0**	2' Shoulder Wedge w/ Overlay	$ 191,344	**1100**	$ 2,852,760	
15	*	HARTWOOD ROAD	612	2	Major Local	**900**	35	7.0	**5 rear end and 9 angle crashes related to intersections; 1 head-on, 2 sideswipe, and 13 run off road road width related**	5.0	**0**	1400	306	0.22	C	**200**	2' Shoulder Wedge w/ Overlay	$ 761,026	**1100**	$ 3,613,786	
16	91	SPOTTED TAVERN RD	614	2	Major local	**1000**	**4**	2.33	**All 4 crashes run off road and spread out**	1.7	**0**	1400	99	0.07	B	**0**	2' Shoulder Wedge w/ Overlay	$ 253,313	**1000**	$ 3,867,099	
17	69	DECATUR RD	635	2	Major local	**900**	**8**	3.59	**6 of 8 crashes caused by narrow road**	2.2	**0**	1400	162	0.12	B	**0**	2' Shoulder Wedge w/ Overlay	$ 390,298	**900**	$ 4,257,397	
18	64	LITTLE WHIM RD	669	2	Major local	**900**	**4**	1.2	**Road geometry related**	3.3	**0**	1300	189	0.15	B	**0**	2' Shoulder Wedge w/ Overlay	$ 130,462	**900**	$ 4,387,858	
19	74	HOLLY CORNER RD	655	2	Major local	**900**	**13**	4.02	**Road geometry related**	3.2	**0**	1300	153	0.12	B	**0**	2' Shoulder Wedge w/ Overlay	$ 437,046	**900**	$ 4,824,905	
20	83	POTOMAC RUN RD	626	2	Major local	**900**	**6**	2.33	**Road geometry related**	2.6	**0**	1200	135	0.11	B	**0**	2' Shoulder Wedge w/ Overlay	$ 253,313	**900**	$ 5,078,218	
21	68	ROCK HILL CHURCH RD	644	2	Minor collector	**800**	**16**	2.74	**Even split, intersection and road geometry**	5.8	**100**	2200	171	0.08	B	**0**	2' Shoulder Wedge w/ Overlay	$ 297,887	**900**	$ 5,376,105	
22	87	CROPP RD	615	2	Major local	**800**	**4**	2.23	**All 4 crashes run off road towards north end**	1.8	**0**	1400	108	0.08	B	**0**	2' Shoulder Wedge w/ Overlay	$ 242,441	**800**	$ 5,618,546	
23	13b	LEELAND RD Morton Rd to End St Maintenance	625		Minor Collector	**800**	**3**	0.9	**Run-off road accidents**	3.3	**0**	1300	153	0.12	B	**0**	2' Shoulder Wedge w/ Overlay	$ 97,846	**800**	$ 5,716,392	
24	47b	BROOKE RD Eskimo Hill to End	608	2	Major local	**700**	**18**	5.79	**12 of 18 apparently road width related crashes**	3.1	**0**	1400	198	0.14	B	**0**	2' Shoulder Wedge w/ Overlay	$ 629,477	**700**	$ 6,345,870	
25	92	RICHARDS FERRY RD	752	2	Major local	**700**	**4**	2.93	**All 4 crashes related to narrow road width**	1.4	**0**	1400	90	0.06	B	**0**	2' Shoulder Wedge w/ Overlay	$ 318,544	**700**	$ 6,664,413	

Stafford County Road Study

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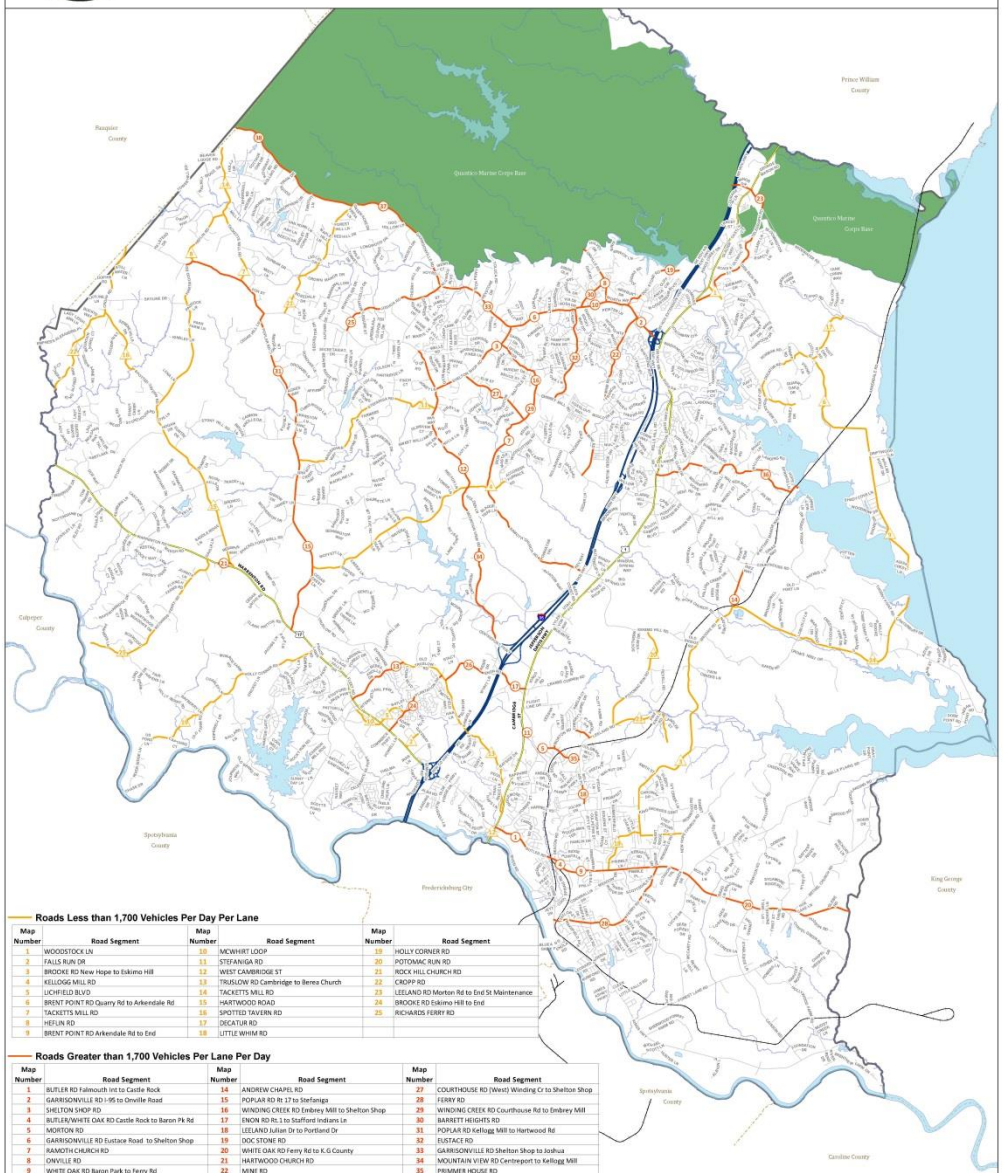


Roads Less than 1,700 Vehicles Per Day Per Lane

Map Number	Road Segment	Map Number	Road Segment	Map Number	Road Segment
1	WOODSTOCK LN	10	MCWHIRT LOOP	19	HOLLY CORNER RD
2	FALLS RUN DR	11	STEFANIGA RD	20	POTOMAC RUN RD
3	BROOKE RD New Hope to Eskimo Hill	12	WEST CAMBRIDGE ST	21	ROCK HILL CHURCH RD
4	KELLOGG MILL RD	13	TRUSLOW RD Cambridge to Berea Church	22	CROPP RD
5	LICHFIELD BLVD	14	TACKETTS MILL RD	23	LEELAND RD Morton Rd to End St Maintenance
6	BRENT POINT RD Quarry Rd to Arkendale Rd	15	HARTWOOD ROAD	24	BROOKE RD Eskimo Hill to End
7	TACKETTS MILL RD	16	SPOTTED TAVERN RD	25	RICHARDS FERRY RD
8	HEFLIN RD	17	DECATUR RD		
9	BRENT POINT RD Arkendale Rd to End	18	LITTLE WHIM RD		

Roads Greater than 1,700 Vehicles Per Lane Per Day

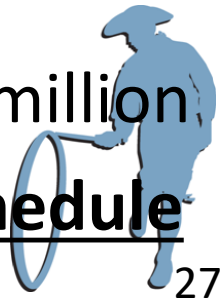
Map Number	Road Segment	Map Number	Road Segment	Map Number	Road Segment
1	BUTLER RD Falmouth Int to Castle Rock	14	ANDREW CHAPEL RD	27	COURTHOUSE RD (West) Winding Cr to Shelton Shop
2	GARRISONVILLE RD I-95 to Onville Road	15	POPLAR RD Rt 17 to Stefaniga	28	FERRY RD
3	SHELTON SHOP RD	16	WINDING CREEK RD Embrey Mill to Shelton Shop	29	WINDING CREEK RD Courthouse Rd to Embrey Mill
4	BUTLER/WHITE OAK RD Castle Rock to Baron Pk Rd	17	ENON RD Rt. 1 to Stafford Indians Ln	30	BARRETT HEIGHTS RD
5	MORTON RD	18	LEELAND Julian Dr to Portland Dr	31	POPLAR RD Kellogg Mill to Hartwood Rd
6	GARRISONVILLE RD Eustace Road to Shelton Shop	19	DOC STONE RD	32	EUSTACE RD
7	RAMOTH CHURCH RD	20	WHITE OAK RD Ferry Rd to K.G County	33	GARRISONVILLE RD Shelton Shop to Joshua
8	ONVILLE RD	21	HARTWOOD CHURCH RD	34	MOUNTAIN VIEW RD Centreport to Kellogg Mill
9	WHITE OAK RD Baron Park to Ferry Rd	22	MINE RD	35	PIMMMER HOUSE RD
10	GARRISONVILLE RD Onville Rd to Eustace Rd	23	TELEGRAPH RD	36	HOPE RD
11	LAYHILL RD	24	PLANTATION DR	37	GARRISONVILLE RD Joshua to Lk Arrowhead
12	MOUNTAIN VIEW RD Kellogg Mill to Choptank Road	25	JOSHUA RD	38	GARRISONVILLE RD Lk Arrowhead to Fauquier
13	BEREA CHURCH RD	26	ENON RD Staff Ind Ln to Truslow Rd		

Coordinate System: NAD 1983 HARN StatePlane Virginia North FIPS 4501 Feet
Produced: 1/3/2019
MXD Path: W:\users\gis\GIS\Planning\Transportation\Road Study\RoadStudy.mxd

0 0.75 1.5 3 4.5 6 Miles

Summary of Study Results

- The Study identified 14 roads/road segments that are a priority for major improvements
- Initial cost estimate for these improvements exceeds $250 million
- Additional analysis is planned to see if this cost can be reduced
- 21 roads/road segments were identified for shoulder wedge improvements
- The estimated cost for these improvements is $6.5 million
- **This relies on coordination with VDOT repaving schedule**



Additional Analysis

- Further refine the major recommended road improvements
- Evaluate possibility of improving heavier traveled roadways using shoulder wedge technique
- Coordinate wedge improvement priorities with VDOT repaving schedule
- Complete windshield survey of listed roads with VDOT personnel to ensure feasibility of wedge improvements

Funding Options

- It is highly unlikely that VDOT will take the lead on these improvements, leaving it to Stafford to initiate action
- There are federal and state funding programs available, and the Board has prioritized taking advantage whenever possible
  - Federal – Highway Safety Improvement, Congestion Mitigation, Regional Surface Transportation are all programs available for funding
  - State – SmartScale, Secondary Six Year, and Revenue Sharing are the three most promising state funding possibilities
  - Each of these options have funding competition, limitations, and wait times

Local Funding

- Options to locally fund highway improvements offer the most control of the timing and scope for highway improvements
- We currently generate revenue for transportation through developer proffers (~$800k/yr), transportation impact fees (~$600k/yr), and the fuels tax (~$600k/yr)
- These sources are insufficient to fund the needs demonstrated by this study – we are using these sources to fund previous and ongoing projects
- Viable options include property taxes earmarked for transportation improvements and a transportation bond
  - Property Taxes – Stafford currently generates about $1.6 million per penny on the tax rate
  - Transportation Bond – at current interest rates, $100 million in debt costs about $8.4 million per year in debt service; or 5 cents on the tax rate for payoff; or about $157 in additional taxes per year for a $300,000 home
- A transportation bond requires approval following a referendum

Local Funding-Service District

- Localities are allowed to establish service districts to support transportation improvements
- Stafford has two service districts- Warrenton Road & Garrisonville Road, which can collect property taxes to fund road improvements
- Boundaries for service districts are established by the Board, subject to the requirements and authority given by the state legislature
- A service district might fund improvements in a targeted area, or potentially a broader area of the County, within the established boundaries
- Funding is derived from property tax assessments similar to the General Fund

Next Steps

- Continue to finalize the study
- Seek input from the public
  - This information will be available from our website, along with the study results and an interactive map
  - conduct the Anne E. Moncure E.S. public information session next Wednesday
- The Board will consider the options for improvements and funding during upcoming deliberations and welcomes your input
- Study results, map & presentation are available at:

https://staffordcountyva.gov/roadstudy

Comprehensive Road Evaluation

Questions?